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|-----------|---------|------------------------|-----------|
| 4,374,090 | 2/1983 | McClure | 422/98 |
| 4,378,499 | 3/1983 | Spangler et al. | 250/287 |
| 4,445,038 | 4/1984 | Spangler et al. | 250/287 X |
| 4,551,624 | 11/1985 | Spangler et al. | 422/98 X |
| 4,712,008 | 12/1987 | Vora et al. | 250/287 |
| 4,777,363 | 10/1988 | Eiceman et al. | 250/287 X |
| 4,950,893 | 8/1990 | Reategui et al. | 250/282 |
| 5,032,721 | 7/1991 | Bacon et al. | 250/282 |
| 5,095,206 | 3/1992 | Bacon, Jr. et al. | 250/282 |

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Related U.S. Application Data

- [63] Continuation-in-part of Ser. No. 687,594, Apr. 17, 1990, Pat. No. 5,095,206, which is a continuation-in-part of Ser. No. 534,701, Jun. 1, 1990, Pat. No. 5,032,721.

[51] Int. Cl.⁵ G01N 24/00

[52] U.S. Cl. **436/173; 436/113;**
436/171; 422/82.01; 422/82.02; 422/90;
422/98; 250/282; 250/286; 250/287; 250/288

[58] **Field of Search** 436/113, 171, 173;
422/82.05, 82.01, 82.02, 83, 90, 98; 250/282,
286, 287, 288

[56] References Cited

U.S. PATENT DOCUMENTS

3.717,028 2/1973 Annino et al. 73/23.36

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[57] **ABSTRACT**

An improved ion mobility spectrometer (IMS) and method for operating the same which enables analysis of ammonia in a mixture of gases when air is used as the carrier gas and the drift gas in the IMS. A controlled concentration of an ester such as Dimethyl methyl phosphonate (DMMP) is added to the air carrier gas stream prior to application of the carrier gas stream. The DMMP clusters with the ammonia, and the drift times of the ionized clusters differ from the drift times of the ions generated from the other constituents of the sample, thereby enabling identification and quantification of the ammonia.

30 Claims, 3 Drawing Sheets

